

**ALEXANDRIA FIRE DEPARTMENT
RESPONSE TO
PEDESTRIANS STRUCK
AND BICYCLE CRASHES**



April 2016

KEY POINTS

Pedestrians Struck

- During 2008-2015, the Alexandria Fire Department (AFD) responded to a total of 648 incidents where a pedestrian was struck by a vehicle. Of these, 556 occurred in Alexandria and were treated by AFD or at a hospital (an average of 70 per year).
- The Healthy People 2020 (HP2020) goal for nonfatal pedestrian injuries on public roads is 22.6 injuries per 100,000 population.² The average age-adjusted rate of AFD responses to pedestrians struck over 2008-2015 was 51.3 per 100,000, or approximately 2.3 times the HP2020 goal of 22.6 per 100,000 non-fatal pedestrian injuries.
- The Alexandria Fire Department was called to the greatest number of pedestrians struck on Wednesdays (19%), and the fewest on Sundays (7%).
- Most (43%) 2015 AFD responses to pedestrians struck were to the 22314 ZIP code.

Bicycle Crashes

- During 2008-2015, AFD responded to a total of 520 bicycle crashes (an average of 65 responses per year).
- Distinct seasonality was observed, with on average six times as many AFD responses per month during the summer (June, July, August) months compared to the winter months (December, January, February).
- Most (56%) 2015 AFD responses to bicycle crashes were to the 22314 ZIP code.

PEDESTRIANS STRUCK

Background and Significance

In 2013 in the U.S., there were an estimated 4,735 pedestrians killed and an estimated 66,000 pedestrians injured in a pedestrian-vehicle crash.¹ The annual number of pedestrians killed in traffic accidents has remained relatively consistent since 2004, while the percentage of total traffic fatalities that have been pedestrians has increased from 11% in 2004 to 14% in 2013.¹

The Healthy People 2020 (HP2020) goal for nonfatal pedestrian injuries on public roads is 22.6 injuries per 100,000 population.² The average age-adjusted rate of Alexandria Fire Department (AFD) responses to pedestrians struck over 2008-2015 was 51.3 per 100,000, or **approximately 2.3 times the HP2020 goal** of 22.6 per 100,000 non-fatal pedestrian injuries. The HP2020 goal for pedestrian deaths on public roads is 1.4 per 100,000 population.³

Data on AFD responses to pedestrians struck were obtained from AFD, are complete from 2008-2015, and include responses by AFD regardless of jurisdiction. Rates were age-adjusted to the US 2000 Standard population⁴ using population data obtained from the US Census Bureau.^{5,6}

Overview

From 2008-2015, AFD responded to 648 incidents where a pedestrian was struck by a vehicle. Of these, 619 occurred within the City of Alexandria and 584 were transported to a hospital, treated by AFD at the scene, or dead at the scene. The remainder of this analysis is restricted to the 556 pedestrian struck incidents occurring in Alexandria where treatment was not refused (so this report can compare to the HP2020 goals for pedestrian injuries).

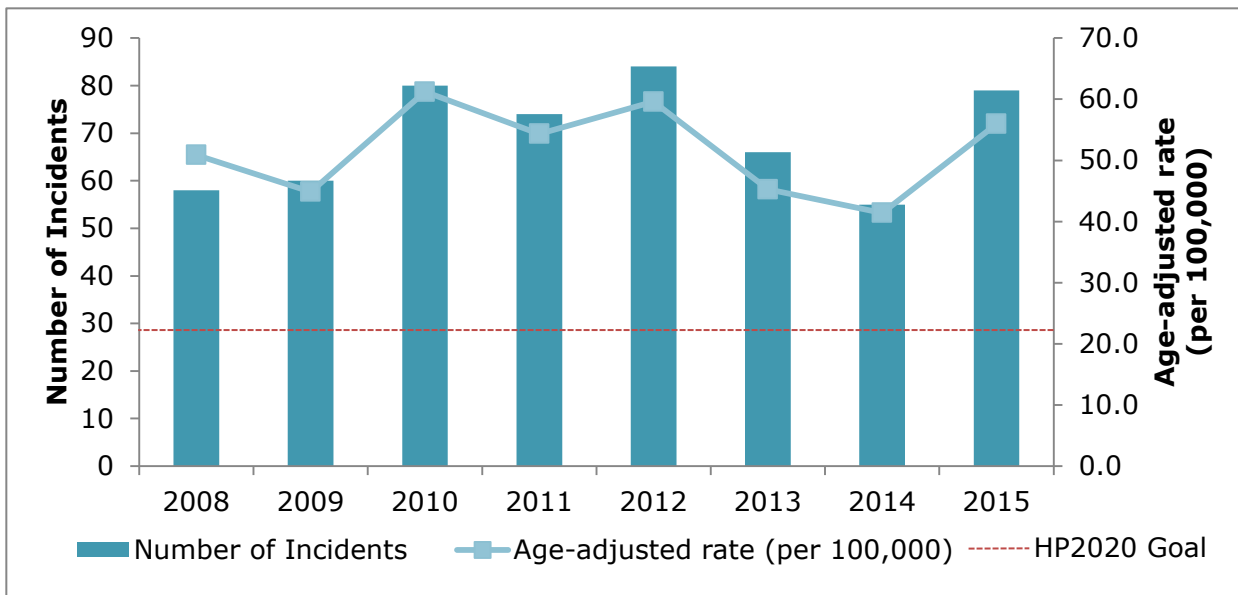


Figure 1. Alexandria Fire Department responses to pedestrians struck, 2008-2015.

The Alexandria Fire Department responded to an average of 70 pedestrians struck per year. Approximately half of these responses were for female pedestrians (48%) and half for males (52%). Most responses were to adults aged 40-64 (38%) or 25-39 (26%) and for non-Hispanic whites (40%) or non-Hispanic blacks (29%). Five patients, from 2008-2015, were dead at the scene.

Comparison with HP2020 goals

The average age-adjusted rate of AFD responses to pedestrians struck over 2008-2015 was 51.3 per 100,000 with no clear trend over time (Figure 1). This rate is **approximately 2.3 times the HP2020 goal** of 22.6 per 100,000 non-fatal pedestrian injuries.

Responses by Season

The average number of AFD pedestrian struck responses varied from 13.9 responses in winter to 20.1 responses in autumn (Figure 2). Nationally autumn has been the deadliest season for pedestrians.⁷

The Alexandria Fire Department was called to the greatest number of pedestrians struck on Wednesdays (19%), and the fewest on Sundays (7%).

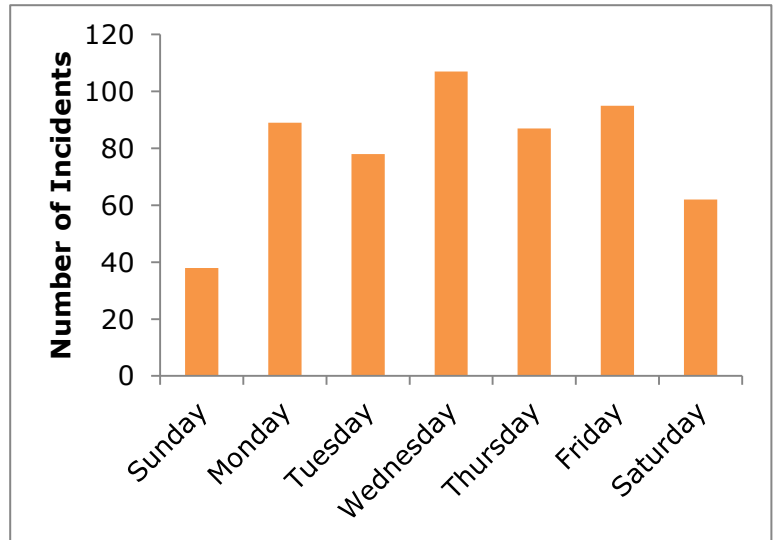
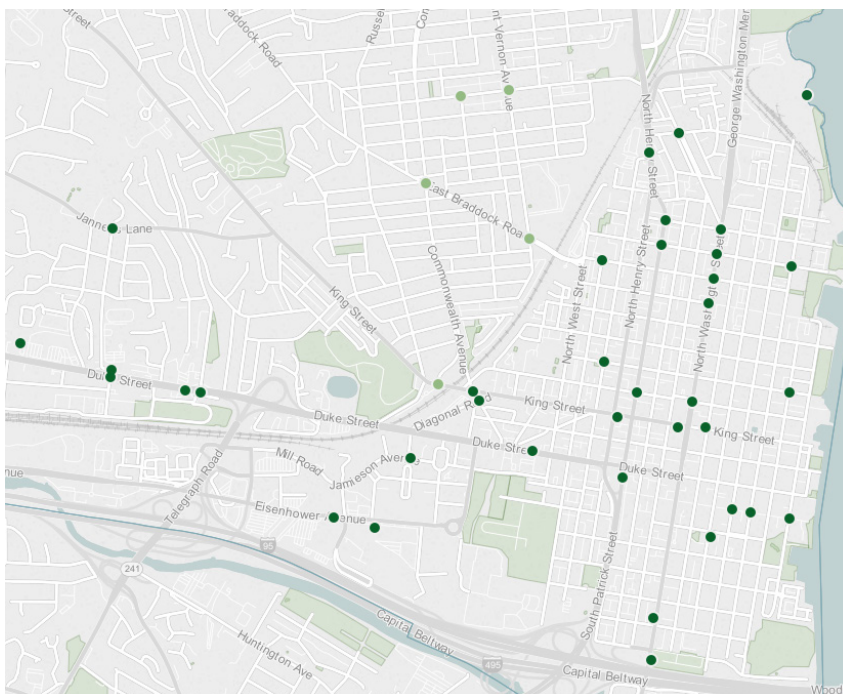


Figure 2. Distribution of Alexandria Fire Department responses to pedestrians struck by day of week, 2008-

2015 AFD Responses to Pedestrians Struck by Incident Location



Geocode data were available only for 2015 responses. In 2015, AFD responded to 79 pedestrians struck; most (43%) occurred in the 22314 ZIP code (Figures 3 and 4, Table 1).

Figure 3. Distribution of 2015 Alexandria Fire Department responses to pedestrians struck in the 22314 ZIP code.

Table 1. Number and rate of 2015 Alexandria Fire Department responses to pedestrians struck by ZIP code.

ZIP Code	Number of Responses	Age-Adjusted Rate (per 100,000)
22314	34	144.7
22305	8	63.4 ^a
22301	8	59.8 ^a
22302	5	36.9 ^a
22304	13	26.4 ^a
22311^b	11	
22312^b	0	

^aThe number of pedestrians struck is too low to calculate stable rates

^bRates not calculated for ZIP codes 22311 and 22312 due to the small proportion of the ZIP codes located inside the Alexandria jurisdiction

The age-adjusted rate of AFD responses was also considerably higher for the 22314 ZIP code (Table 1) at 144.7 responses per 100,000 residents.

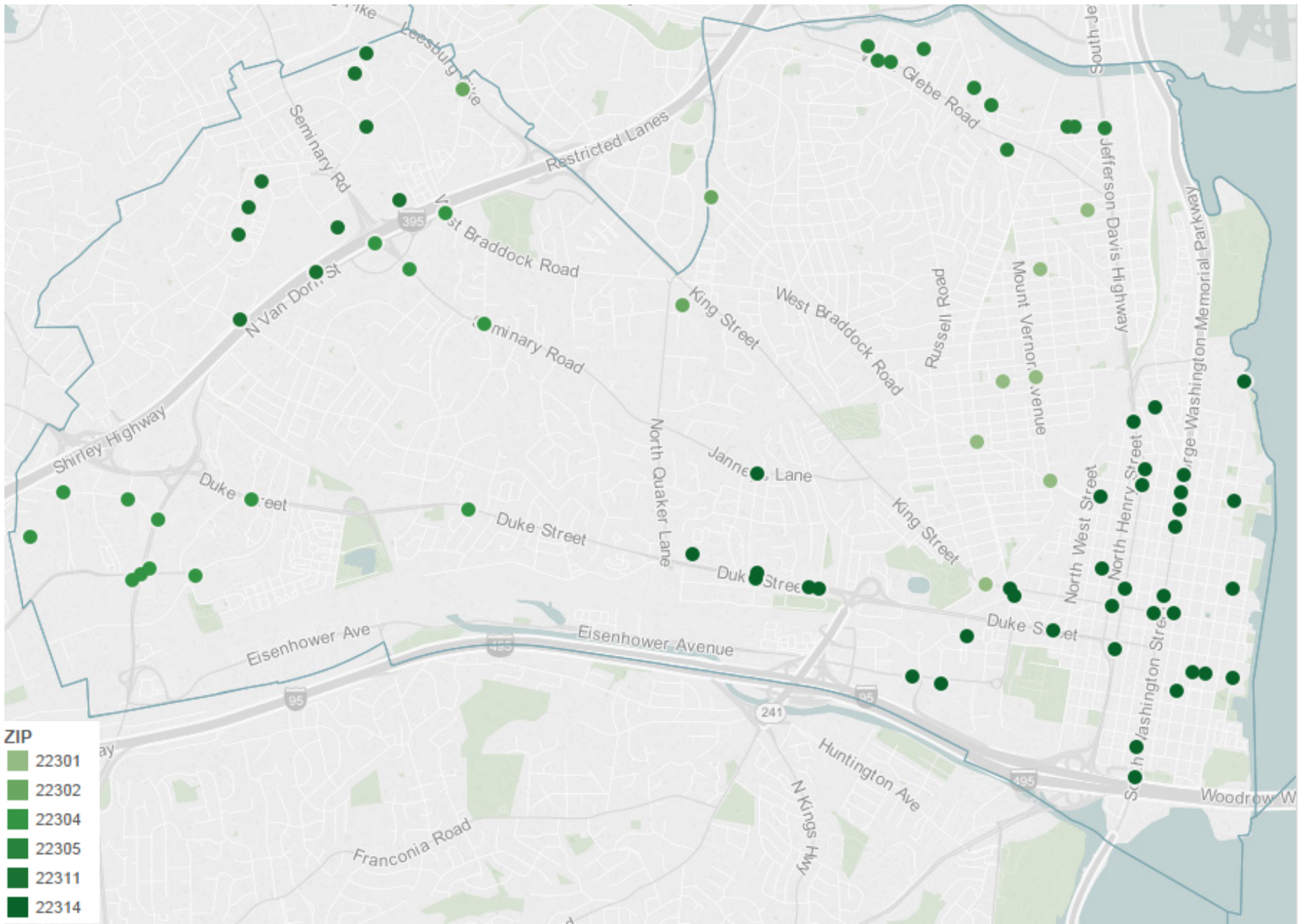


Figure 4. Distribution of 2015 Alexandria Fire Department responses to pedestrians struck.

References

- ¹National Highway Traffic Safety Administration. Traffic Safety Facts: Pedestrians. February 2015. Available at <http://www-nrd.nhtsa.dot.gov/Pubs/812124.pdf>. Accessed April 11, 2016.
- ²Healthy People 2020. Unintentional Injury Prevention: IVP-19. Reduce nonfatal pedestrian injuries on public roads. Available <https://www.healthypeople.gov/2020/topics-objectives/objective/ivp-19>. Accessed April 8, 2016.
- ³Healthy People 2020. Unintentional Injury Prevention: IVP-18. Reduce pedestrian deaths on public roads. Available <https://www.healthypeople.gov/2020/topics-objectives/objective/ivp-18>. Accessed April 8, 2016.
- ⁴National Cancer Institute Surveillance, Epidemiology, and End Results Program (NCI SEER). SEER*Stat Tutorials: Calculating Age-adjusted Rates. Available at <http://seer.cancer.gov/seerstat/tutorials/aarates/definition.html>. Accessed April 11, 2016.
- ⁵U.S. Census Bureau. State Characteristics: Vintage 2014. Available <http://www.census.gov/popest/data/state/asrh/2014/index.html>. Accessed April 4, 2016.
- ⁶U.S. Census Bureau. American FactFinder: 2014 American Community Survey. Available at http://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml. Accessed April 11, 2016.
- ⁷National Highway Traffic Safety Administration. National Pedestrian Crash Report, June 2008. Available at <http://www-nrd.nhtsa.dot.gov/Pubs/810968.PDF>. Accessed April 11, 2016.
- ⁸City of Alexandria Transportation Master Plan: Pedestrian and Bicycle Chapter (Draft). February, 2016. Available https://www.alexandriava.gov/uploadedFiles/tes/info/Alexandria%20Ped%20Bike%20Master%20Plan_V4_low%20res.pdf. Accessed April 8, 2016.

BICYCLE CRASHES

Background and Significance

Bicyclists face a higher risk of crash-related injury and deaths than occupants of motor vehicles even though only about 1% of all trips taken in the US are by bicycle.¹ In 2013 in the U.S., there were an estimated 494,000 emergency department visits due to bicycle-related injuries, primarily among children (5-14 years), adolescents, and young adults (15-24 years) . Males are much more likely to be killed or injured on bicycles than are females.¹

Data on Alexandria Fire Department (AFD) bicycle crash responses were obtained from AFD, are complete from 2008-2015, and include incidents responded to by AFD regardless of jurisdiction. Rates were age-adjusted to the US 2000 Standard population² using population data obtained from the US Census Bureau.^{3,4}

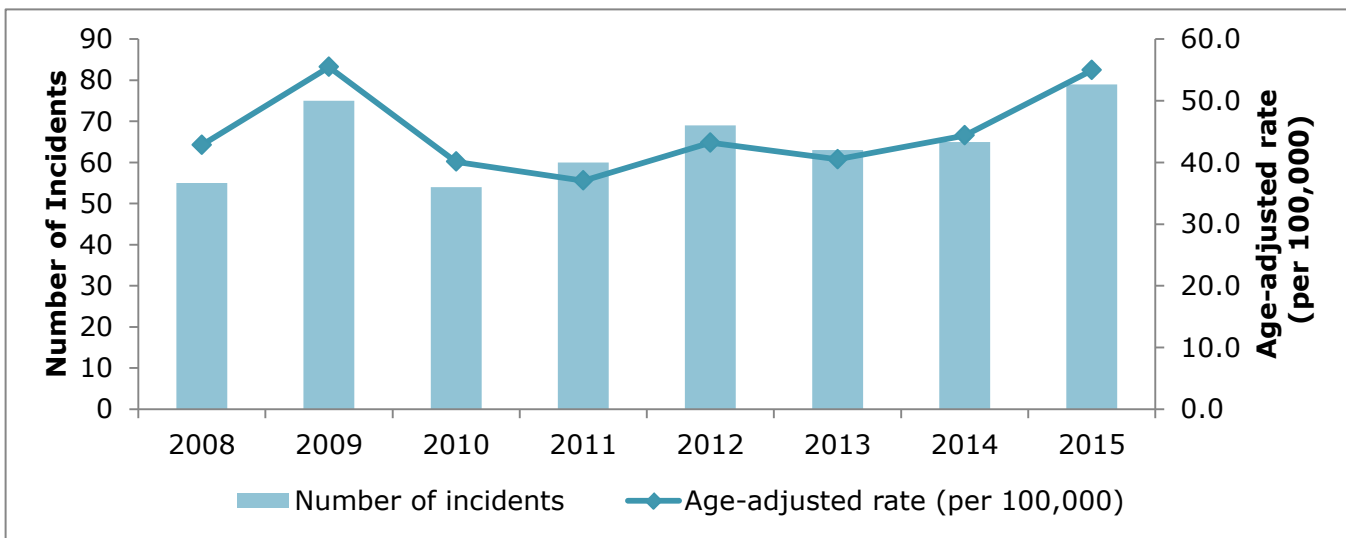


Figure 1. Alexandria Fire Department responses to bicycle crashes, 2008-2015.

Overview of Alexandria Fire Department Bicycle Crash Response Data

During 2008-2015 AFD responded to a total of 520 bicycle crashes (an average of 65 responses per year). Most were among men (77%), non-Hispanic Whites (60%), and those aged 40-64 (37%) or 25-39 (34%). Nearly all AFD responses (96%) were for incidents that occurred in Alexandria, with small numbers occurring in Arlington (3%) and Fairfax (1%).

Approximately two-thirds (66%) of responses required transport to a hospital, while 20% were treated at the incident location only. Of the patients transported, most were taken to Inova Alexandria Hospital (65%), Inova Fairfax Hospital (20%), or George Washington University Hospital (11%).

Comparison with HP2020 goals

Healthy People 2020 (HP2020) does not have a goal for non-fatal pedacyclist injuries (HP2020 uses the term “pedacyclist”, which is a bicyclist or other cyclist including riders of two-wheel, non-motorized vehicles, tricycles, and unicycles powered solely by pedals⁵).

The HP2020 goal for pedacyclist deaths on public roads is 0.22 per 100,000 population.⁶ There were no bicyclist fatalities recorded in the AFD data.

Responses by Season

Distinct seasonality was observed and was consistent over 2008-2015 (Figure 2). As expected, the average number of AFD responses peaked in the warmer, summer months (June, July, and August) with six times as many responses per month as during the winter (December, January, February).

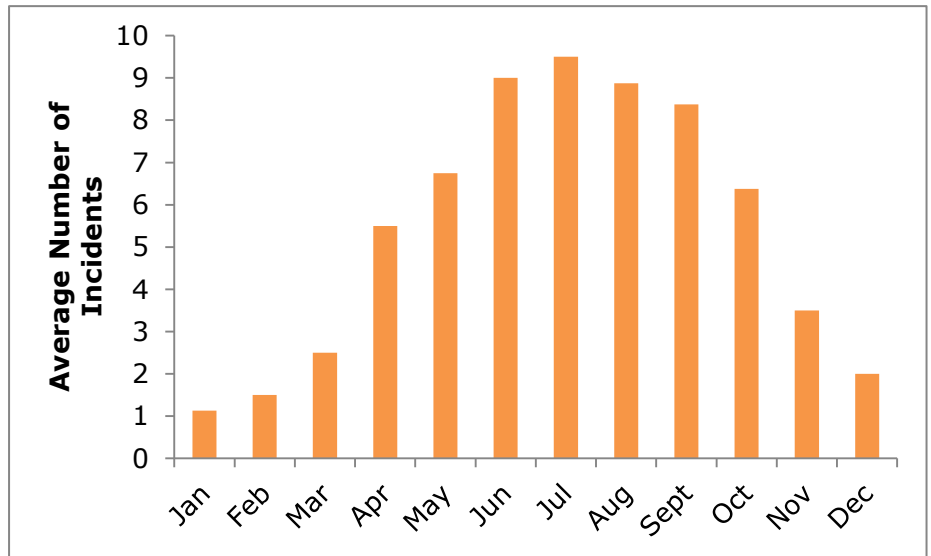
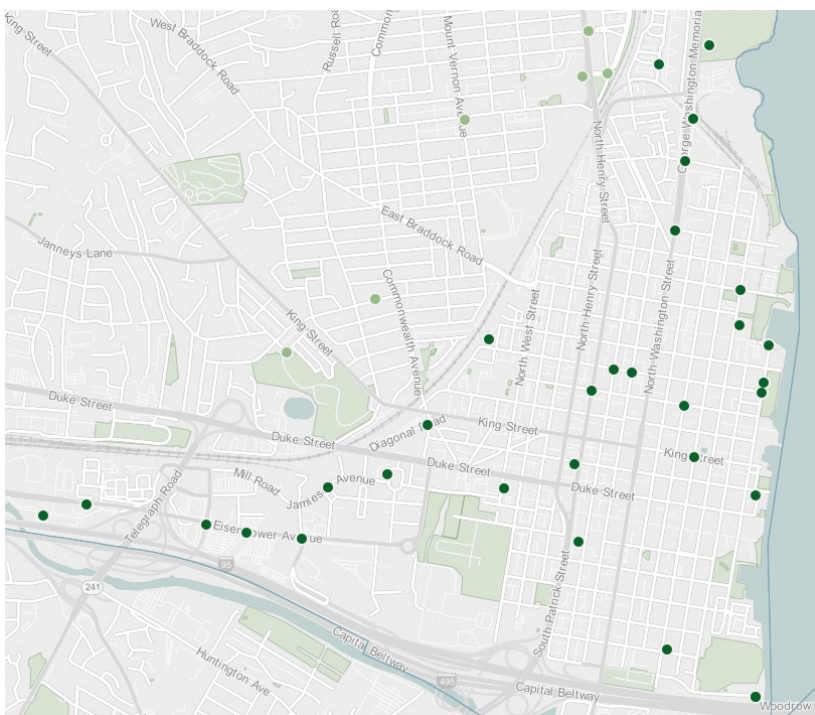


Figure 2. Average number of Alexandria Fire Department responses to bicycle crashes by month of occurrence.

2015 Alexandria Fire Department Road Responses to Bicycle Crashes by Incident Location



Geocode data were available for 2015 AFD responses. During 2015 AFD responded to a total of 70 bicycle crashes; most (56%) occurred in the 22314 ZIP code (Figures 3 and 4). The geographic distribution of responses for bicycle crashes is similar to 2004-2014 data previously presented from the Alexandria Police Department.⁷

Figure 3. Distribution of 2015 Alexandria Fire Department Responses to bicycle crashes in the 22314 ZIP code.

Table 1. Distribution of 2015 Alexandria Fire Department responses to bicycle crashes by type of bike lane⁸ and ZIP code.

	Bike Lane	Off-street bikeway	On-street Bike Route	Shared Lane Marking	Not designated	Total
22301	0	3	2	1	0	6
22302	1	0	2	0	1	4
22304	0	2	1	0	6	9
22305	1	4	0	0	3	8
22311	0	0	0	0	2	2
22312	0	0	0	1	1	2
22314	5	16	5	1	12	39

Within each ZIP code, the most frequent type of bike lane associated with an AFD response to a bicycle crash were (Table 1): 22301, Off-Street Bikeway; 22302, On-street Bike Route; 22304, Not designated; 22305, Off-street Bikeway; 22311, Not designated; 22312, Shared Lane marking and Not designated; and 22314, Off-street Bikeway and Not designated.

Table 2. Number and rate of 2015 Alexandria Fire Department responses to bicycle crashes by ZIP code.

ZIP Code	Number of Responses	Age-Adjusted Rate (per 100,000)
22314	39	105.8
22301	6	59.7 ^a
22305	8	54.2 ^a
22302	4	27.2 ^a
22304	9	23.3 ^a
22311^b	2	
22312^b	2	

^aThe number of bicycle crashes is too low to calculate stable rates

^bRates not calculated for ZIP codes 22311 and 22312 due to the small proportion of the ZIP codes located inside the Alexandria jurisdiction

The age-adjusted rate of responses was considerably higher for the 22314 ZIP code, at 105.8 responses per 100,000 residents, compared to other City ZIP codes (Table 2).

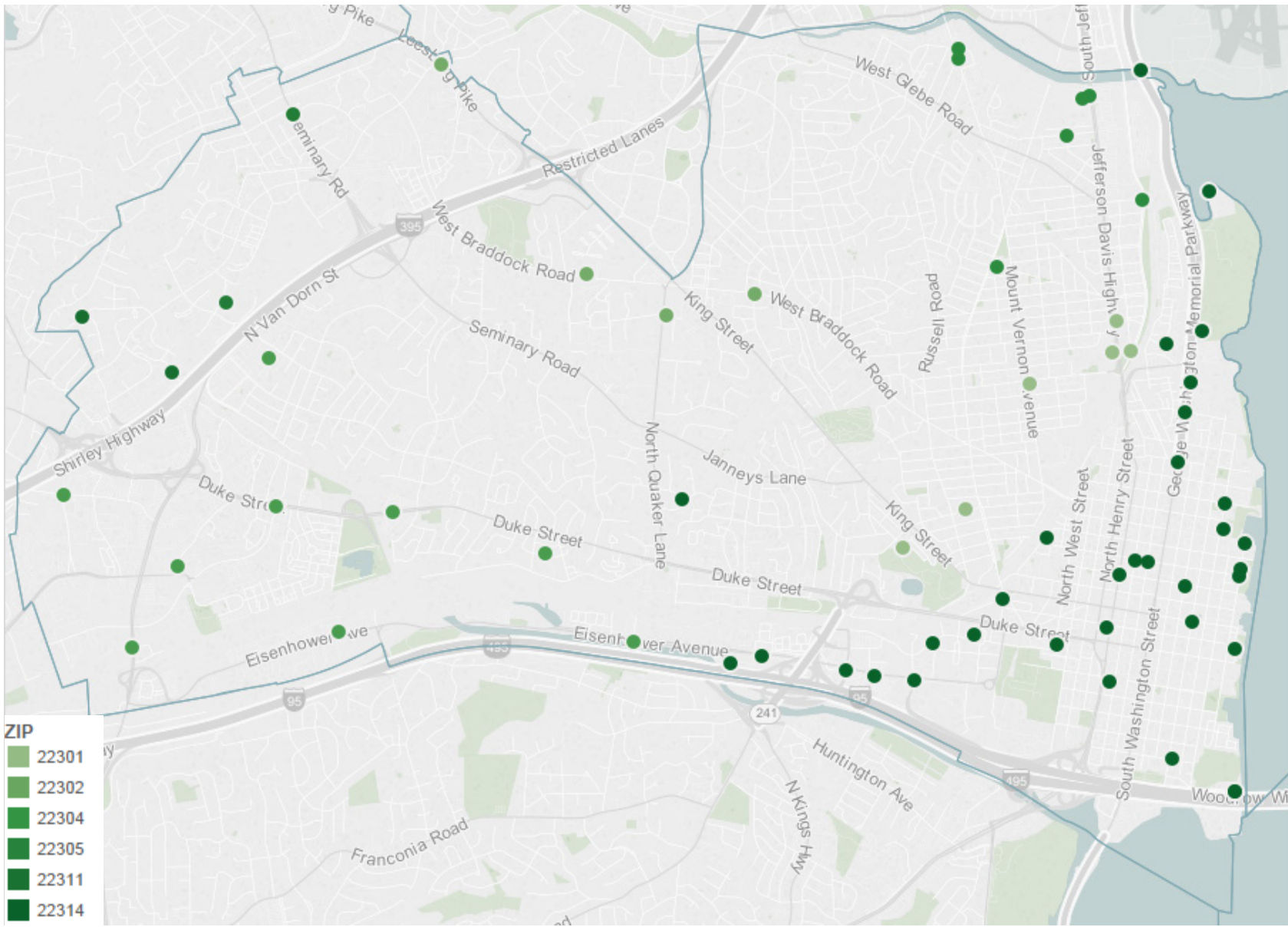


Figure 4. Distribution of 2015 Alexandria Fire Department responses to bicycle crashes.

References

- ¹Centers for Disease Control and Prevention. Bicycle Safety. Available at <http://www.cdc.gov/motorvehiclesafety/bicycle/index.html>. Accessed April 11, 2016.
- ²National Cancer Institute Surveillance, Epidemiology, and End Results Program (NCI SEER). SEER*Stat Tutorials: Calculating Age-adjusted Rates. Available at <http://seer.cancer.gov/seerstat/tutorials/aarates/definition.html>. Accessed April 11, 2016.
- ³U.S. Census Bureau. State Characteristics: Vintage 2014. Available <http://www.census.gov/popest/data/state/asrh/2014/index.html>. Accessed April 4, 2016.
- ⁴U.S. Census Bureau. American FactFinder: 2014 American Community Survey. Available at http://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml. Accessed April 11, 2016.
- ⁵National Highway Traffic Safety Administration. Traffic Safety Facts: Bicyclists and Other Cyclists. Available at: <http://www-nrd.nhtsa.dot.gov/Pubs/812151.pdf>. Accessed April 14, 2016.
- ⁶Healthy People 2020. Injury and Violence Prevention: IVP-20. Reduce pedacyclist deaths on public roads. Available <https://www.healthypeople.gov/2020/data-search/Search-the-Data?nid=4748>. Accessed April 11, 2016.
- ⁷City of Alexandria Transportation Master Plan: Pedestrian and Bicycle Chapter (Draft). February, 2016. Available at https://www.alexandriava.gov/uploadedFiles/tes/info/Alexandria%20Ped%20Bike%20Master%20Plan_V4_low%20res.pdf. Accessed April 8, 2016.
- ⁸Alexandria Bike Map. Available at <https://www.alexandriava.gov/localmotion/info/default.aspx?id=11546>. Accessed April 8, 2016.

Age-Adjusted Rates and Limitations

Age-Adjusted Rates

A common epidemiologic method is to adjust rates around influencing demographic factors in order to appropriately compare one group to another. Age adjusted rates were calculated to reduce the effect of age in the rates of AFD responses to pedestrians struck and bicycle crashes because incidents of these events occur differently across the life span. Age adjusted rates were calculated by weighting the rates within specific age groups by the proportion of a “standard” population in that age group. The proportions utilized herein are the U.S. 2000 Standard Population, thereby enabling informative comparisons to age adjusted rates calculated in other populations using the U.S. 2000 Standard Population.

Limitations

The bicycle crash data provided by AFD likely represent a more severe subset of the total number of pedestrians struck and bicycle crashes occurring in Alexandria because less severe incidents would not have activated AFD. The 2016 City of Alexandria Master Transportation Plan utilized data from police reports to quantify the occurrence of these events. It is possible that there may be deaths not captured in AFD data (e.g. among pedestrians and bicyclists who died at the hospital after transport by AFD).